

Perth air quality management plan

report card

2010/2011



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March 2012

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Air Quality Coordinating Committee

The Air Quality Coordinating Committee (AQCC) includes representatives from state and local government, industry, business and the community. Its role is to monitor the implementation of the Perth AQMP and review the progress towards achieving its aims.

More information

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This document was published by the Department of Environment and Conservation on behalf of the Air Quality Coordinating Committee.

This information is available in alternative formats on request.



Executive summary

Welcome to the second *Perth air quality management plan report card* for 1 July 2010 to 30 June 2011. This report provides a clear and concise overview of *Perth air quality management plan* (Perth AQMP) activities to inform the community and enhance interest in air quality issues.

Publishing the *Five-year review of the Perth AQMP* and the *Government response to the review* provided new focus and direction for air quality management in Perth over the 2010–11 financial year. The Air Quality Coordinating Committee (AQCC) continues to lead redevelopment of the AQMP as well as implementing sweeping reforms to streamline coordination of air quality management actions.

Several key events occurred in this reporting period, including the launch of the CleanRun EcoDrive guide by the Hon Bill Marmion, Minister for Environment in May 2011. Other notable events include the launch of the WA electric vehicle trail website in February 2011 and publication of *Directions 2031 and Beyond* in August 2010.

This year we would like to again recognise the efforts of the Perth community, who have worked together to allow for these achievements, and the many more described in this report, to occur. Your feedback and continued involvement is encouraged and appreciated.

Stuart Cowie
AQCC Chairperson

March 2012



Introduction

Perth AQMP

The Perth AQMP, released in December 2000, was developed to improve and maintain clean air throughout the Perth metropolitan region over 30 years. This whole-of-government initiative was developed via a consultative process including key government agencies with lead roles in implementation and a range of stakeholders. The Perth AQMP outlines strategies and programs aimed at continually improving air quality and avoiding adverse health and environmental impacts.



About this publication

The report card replaces the detailed progress report previously produced by the AQCC. Supporting information is included at the end of this document and further information is available on the DEC website at www.dec.wa.gov.au/airquality.

Current initiatives of the AQMP

- 1 Community education
- 2 Vehicle emissions reduction
- 3 Industrial emissions reduction
- 4 Health research
- 5 Modelling and monitoring
- 6 Indoor air quality
- 7 Land use and transport planning
- 8 Haze reduction
- 9 Small to medium enterprise (SME) emissions reduction
- 10 Smoke management

The following sections of the report card provide a summary of the management actions undertaken, an update of air quality influences and the latest air quality data.





Resource tables

Table 1 Resource use per agency 1 July 2010 to 30 June 2011

Agency	Staff (FTE) ¹	Operations (\$)
DEC	8.5	410,000
Department of Transport (DoT)	25.25	3,127,000
Department of Planning (DoP)	Not reported	Not reported
Department of Health (DoH)	Nil	Nil
Office of Energy (OoE)	Not reported	Not reported
Fire and Emergency Services (FESA)	Not reported	Not reported
Total	33.75	3,537,000

¹FTE (full-time equivalent)

Disclaimer: The figures provided are representative of the estimated contributions of each agency. These figures may not be exact as actions within the AQMP form part of agency business plan achievements.

Table 2 Resource use per initiative 1 July 2010 to 30 June 2011

Initiative	Staff (FTE) ¹	Operational (\$)
Initiative 1	19.75	1,217,000
Initiative 2	5	295,000
Initiative 3	Nil	Nil
Initiative 4	Nil	Nil
Initiative 5	1.5	50,000
Initiative 6	0.1	Nil
Initiative 7	6	1,905,000
Initiative 8	0.9	50,000
Initiative 9	Nil	Nil
Initiative 10	0.5	20,000
Total	33.75	3,537,000

¹FTE (full-time equivalent)

Disclaimer: The figures provided are representative of the estimated contributions of each agency. These figures may not be exact as actions within the AQMP form part of agency business plan achievements.

Management actions

There has been good progress over the past 12 months implementing key aspects of the Perth AQMP including:

- ongoing development and implementation of community education initiatives to raise awareness of air quality issues and influence behaviour change (such as AirWatch)



- ongoing programs to change commuter behaviour to reduce the reliance on private vehicle use including the TravelSmart suite of programs involving the delivery of four forums for TravelSmart Workplace and the continuation of Bikeweek, Cycle Instead and Walk There Today initiatives (DoT/DEC)
- refinement and implementation of CleanRun; including the Remote Sensor (vehicle emissions testing) and EcoDrive programs (DEC)
- smoky vehicle reporting program (SVRP) received a total number of 688 reports for the twelve months from July 2010 to June 2011. Approximately 40 per cent of vehicle owners reported making repairs to their smoky vehicles (DEC)
- input into the ongoing development of the review of the National Environment Protection (Ambient Air Quality) Measure
- implementation and review of smoke patrol programs conducted with the City of Canning to reduce the incidence of unacceptable levels of domestic smoke from chimneys (DEC)
- continued development of coordinated approaches to managing smoke from planned burning activities (DEC and FESA)
- ongoing administration of the National Australian Built Environment Rating System program for commercial buildings (OoE)
- ongoing delivery of the City Switch Green Office program (OoE and City of Perth)
- participation in the National Strategy on Energy Efficiency that includes a number of national initiatives for improved energy efficiency in households and businesses (OoE).





New projects in 2010–11

- CleanRun EcoDrive was officially launched by the WA Environment Minister, Hon. Bill Marmion on 25 May 2011. The EcoDrive resources are available to download free-of-charge from DEC's website at www.dec.wa.gov.au/airquality (DEC)
- Remote sensing monitoring of vehicle emissions for 20 days over 10 locations, with 33,000 vehicles tested (DEC)
- Geography, earth and environmental sciences day display of vehicle emissions testing as well as two general community education days in Kings Park (DEC)
- Curtin University PhD project investigating barriers to uptake cleaner production by industry (specifically small to medium-sized enterprises) (Curtin University and DEC)
- Partnership between DoH and DEC fire management services for advice on health implications of fire management
- Assessment of new development proposals with consideration of air quality impacts (DoP)
- Health risk assessment of air emissions in Port Hedland (DoH)
- Particle characterisation of Port Hedland air emissions (DoH)
- Expand review of air quality guidelines for selected substances (DoH and DEC)
- Teleworking clinic for public sector (Public Sector Commission and Department of Commerce)
- Electric vehicle recharging project (DoT and Electric Vehicle Association)
- Electric vehicle government fleet trials (DEC and DoT) and launch of the WA electric vehicle trail website in February 2011
- Incorporating air quality monitoring into the Citizen Science program (Conservation Council WA)
- Development of an economic development strategy which recognises the importance on home-based employment and businesses, derived from research and consultation under *Directions 2031 and Beyond* (DoP)

Completed projects

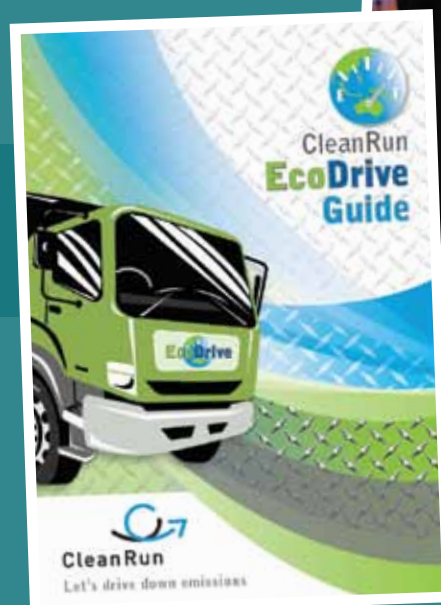
- Improvements to public health website with new publications made available (DoH)
- Part 1 of the Kwinana Children's Respiratory Health study finalised (DoH)
- Perth Solar City program which used the LivingSmart Household methodology that reached 10,000 households in Perth's eastern suburbs. In total, 4,835 households were engaged with the interactive program (DoT)
- Australian transport research forum presentation on travel plans (DoT)
- Improved cycle access through the Claremont principal shared path link (DoT)
- Walkability audit tool developed for local governments to assess and improve pedestrian access (DoT)

- Biogenics (emissions from natural vegetation) work resulted in better representation of the contributions by biogenic sources to photochemical smog (DEC)
- Expansion of the central area transport (CAT) bus service to include an additional seven buses and 17 drivers, increased frequency of buses, extended operating hours and weekend services and inclusion of a West Perth only loop due to demand in this area (DoT)
- State Planning Policy 4.1 *State Industrial Buffer Policy* was reviewed and land use buffers were incorporated into *Directions 2031 and Beyond* (DoP)
- Transit-oriented development and accessible community plans for some areas have been completed to ensure these areas are less reliant on private transport (DoP)

CleanRun EcoDrive

The CleanRun EcoDrive guide was launched on 25 May 2011 by the WA Environment Minister, Hon. Bill Marmion. The EcoDrive guide assists the transport industry in promoting cleaner, safer driving while cutting fuel and maintenance costs. The guide provides all the resources to develop an EcoDrive training program, with the potential for the information to be easily translated into advice for everyday commuters.

The environmental, safety and cost saving benefits of this program have been well received by transport industry representatives who have been involved with the program.



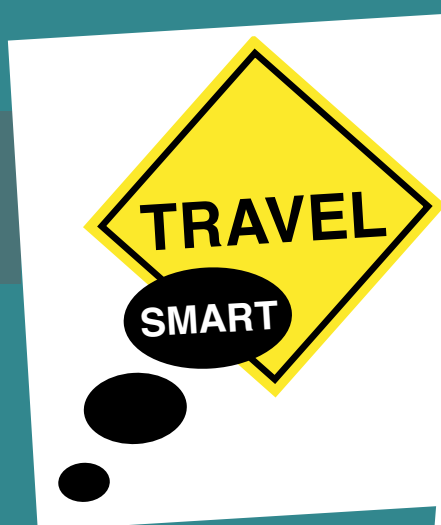


Future/ongoing projects

In the year ahead several key programs and actions are scheduled including:

- continuation of education initiatives to raise community awareness, educate and provide information, and support community and stakeholder involvement (such as AirWatch)
- analysis of air monitoring data from Kwinana in conjunction with the Kwinana Children's Respiratory Health study (first two reports due for release in 2012) (DEC and DoH)
- AirWatch teacher engagement seminars (DEC)
- continuation of the Energy Smart for Air project (DEC)
- review of the Channel Seven WeatherWatch partnership (DEC)
- review of the existing education and behaviour change programs and establish a strategy and framework for developing and implementing supporting programs in the future (DEC)
- continued promotion of the TravelSmart Workplace (10 plans in preparation) and teleworking; and assessment of the external evaluation to review current practices and investigate new delivery models (DEC and DoT)
- continued promotion of TravelSmart to School and Walking School Bus programs (DoT)
- completion of Energy 2031 document expected to be released in mid 2012 (DoT)
- completion of the Perth Bicycle Network Plan expected to be released in mid 2012 (DoT)
- continued fourier transform infrared spectroscopy (FTIR) monitoring of hydrogen chloride and hydrogen fluoride in Midland (DEC)
- continuation of CleanRun Remote Sensing and EcoDrive programs (DEC)
- analysis of vehicle testing data, with planning for further remote sensing projects to target and measure vehicle emissions. These projects will include identification of future priority groups for behaviour change programs (DEC)
- develop a smoke patrol 'how to' toolkit for local government authorities (DEC) to facilitate implementation of the program to reduce the incidence of domestic wood smoke as a significant contributor to haze in the Perth airshed (DEC).
- build a wood heater demonstration trailer and develop supporting education materials to reduce the incidence of domestic wood smoke by assisting wood heater users operate their heaters more efficiently and effectively (DEC).
- progressing with amendments to the Environmental Protection (Diesel and Petrol) Regulations 1999 (WA) (DEC)
- implementation of recommendations arising from DoT investigation into 'wayfinding' in central Perth to reduce congestion and emissions by encouraging more efficient use of the available parking spaces and road space (DoT)
- continued improvements to the CAT bus service (DoT)
- publication of integrated transport plan guidelines for local government expected to be finalised in mid 2012 (DoP)
- Arup and Parsons Brinkerhoff TravelSmart workplace plan implementation (DoT)

- finalisation of the transport assessment guidelines for a more formal inclusion into the statutory planning process (DoP)
- completion of planning reviews and modified carriageway and reservation plans for Southern River Road, Garden Street, Lloyd Street and Lakes Road (DoP)
- implementation of *Directions 2031 and Beyond* (DoP)
- continuation of 'Kwinana Children's Respiratory Health Study' (supervisory role) (DoH)
- finalisation of guidance document for air quality index (AQI) during smoke incidents (second draft) (DoH)
- implementation of revised TravelSmart to School program (DoT)
- continued delivery of the Living Smart Household program (DoT)
- continued delivery of the Cycle Instead bike week program (DoT).



TravelSmart workplace

Under the TravelSmart workplace program, the Department of Transport and DEC worked with Arup and Parsons Brinckerhoff to develop travel plans. A total of 40 travel plans have now been completed through the program since 2000. An additional eight travel plans are currently under development. Those workplaces that completed travel plans and those that joined the program were recognised at the launch held on 18 October 2010 attended by the then Minister for Transport.

An evaluation of the program estimated that participating organisations that had recently undertaken evaluation surveys had reduced vehicle kilometres travelled by 5.63 million kilometres in 2010–11, providing a net economic benefit (primarily reduced congestion and vehicle operating costs) of \$2.4 million.



AQCC current membership

Membership at 30 June 2011:

State government

- Stuart Cowie (Department of Environment and Conservation) – Chairperson
- Jim Dodds (Department of Health)
- Luke O'Donoghue (Department of Transport)
- Ashley Wilson (Department of Planning)
- Angela Heymans (Department of Commerce)
- Stephanie Doeltsch (Office of Energy)

Local government

- Beverly Olsen (Western Australian Local Government Association)

Community

- Prof. Philip Jennings (Conservation Council of Western Australia (WA))
- Dr Sue Graham-Taylor (Pollution Action Network)

Business and industry

- Gavin Scally (BP for Kwinana Industries Council)
- Matthew Brown (Royal Automobile Club of WA)

One meeting of the AQCC was held during the reporting period on 28 June 2011.

New Perth AQMP publications

- Dust and health fact sheet (DoH)
- Asbestos fact sheets (DoH)
- Hydrogen sulphide fact sheet (DoH)
- *Strategic Energy Initiatives* directions paper (released March 2011) (DoT)
- *Directions 2031 and Beyond* (August 2010) (DoP)
- State Planning Policy 4.2 *Activity Centres for Perth and Peel* (August 2010) (DoP).

Contact the AQCC

For more information please contact the secretariat to the Perth AQMP at DEC on 9333 7435, AQCCadmin@dec.wa.gov.au or via the website at www.dec.wa.gov.au/airquality.



Summary

- compliance with the National Environment Protection Measure (NEPM) goals, within the Perth metropolitan area, for all the pollutants except advisory standards for particles (measured as $PM_{2.5}$) during 2010
- enhanced community education initiatives to raise community awareness of air quality issues
- improved commuter behaviour change programs, including TravelSmart and expansion of bicycle networks
- vehicle emission reduction through the use of the CleanRun Remote Sensor and EcoDrive programs
- inclusion and trial of electric vehicles in government fleets (DEC and DoT)
- continued winter haze reduction programs, for example smoke patrols (DEC)
- expansion of the CAT bus service to include an additional seven buses and 17 drivers, increased frequency of buses, extended operating hours and weekend services and inclusion of a West Perth only loop due to demand in this area (DoT).

Progress summary

Table 3 Perth AQMP summary of progress on initiatives, programs and actions

The table summarises progress undertaken by agencies to complete the initiatives and programs of the Perth AQMP.	Action				Lead agency
	No progress	Progressed	Completed	Future work	
Initiative 1: Community education					
P1: Review existing education and behaviour change programs and establish a strategy and framework for developing and implementing supporting programs in future				✓	DEC and DoT
P2: Improve everyone's access to air quality information and programs via the Internet		✓		✓	DEC, DoT and DoH
P3: Influence the community's travel behaviour through implementing TravelSmart, teleworking and other travel alternatives		✓		✓	DoT and DEC
Initiative 2: Vehicle emissions reduction					
P1: Develop policy and regulations for automotive fuel quality in WA, promote national fuel quality regulation in line with international standards and coordinate fuel quality standards with improved vehicle emission standards		✓		✓	DEC
P2: Evaluate LPG and CNG as fuel sources for the passenger and freight sectors			✓		DEC
P3: Evaluate various emissions testing options for introduction to Perth and implement the committed outcomes to reduce in-service emissions from motor vehicles		✓		✓	DEC
P4: On-road enforcement of controls on excessive vehicle emissions		✓		✓	DoT and DEC
P5: Evaluate and introduce appropriate measures to remove older vehicles from the Perth fleet			✓		DEC with DoT
P6: Emissions testing training and equipment and technology review			✓		DEC
P7: Investigate the cost effectiveness of Stage II vapour recovery and promote if cost effective				✓	DEC
P8: Investigate the use of electric, alternative fuel vehicles and ultra-light vehicles		✓		✓	DoT
Initiative 3: Industrial emissions reduction					
P1: Assess contribution of industrial NOx and ROC emissions to smog formation in the Perth airshed		✓			DEC
P2: Assess cost effective NOx emission reduction options, and implement agreed options to reduce emissions from significant industrial sources	✓				DEC
P3: Identify and assist the major emitters of ROCs to reduce industrial contributions, and encourage continuous improvement in ROC reduction measures already introduced	✓				DEC
P4: Promote the awareness of industry achievements in atmospheric emission reduction through 'green industry' awards				✓	DEC
P5: Ensure proper airshed planning for future industrial development and power generation in the Perth metropolitan region		✓		✓	DEC



The table summarises progress undertaken by agencies to complete the initiatives and programs of the Perth AQMP. More detailed information on the initiatives and programs is provided in the detailed agency section in Appendix 1.	Action				Lead agency
	No progress	Progressed	Completed	Future work	
Initiative 4: Health research					
P1: Investigating the public health impacts of air pollution		✓		✓	DoH
P2: Investigating sources of air pollutants and their impact on residents by determining the potential health impacts of variations in Perth's daily air quality		✓		✓	DoH
P3: Development of an air pollution and health network	✓			✓	DoH
Initiative 5: Modelling and monitoring					
P1: Update and consolidate air emissions databases		✓	✓	✓	DEC
P2: Validate/improve emissions estimates for key emission sources		✓		✓	DEC
P3: Improve modelling capability and accuracy		✓		✓	DEC
P4: Establish a monitoring steering committee to review air quality monitoring issues in the Perth metro area				✓	DEC
P5: Review air quality monitoring practices and procedures in the Perth metropolitan region		✓			DEC
P6: Develop future monitoring programs		✓			DEC
P7: Support community information and education programs on air quality monitoring		✓		✓	DEC
Initiative 6: Indoor air quality					
P1: Development of an indoor air quality network	✓				DEC
P2: Investigate indoor air quality and the contribution of indoor air exposure to personal exposure	✓				DoH and DEC
P3: Increase community indoor air quality awareness	✓			✓	DEC and DoH
Initiative 7: Land use and transport planning					
P1: Include regional and local air quality considerations in the strategic planning and implementation of Future Perth		✓	✓		DoP
P2: Include regional and local air quality considerations in the planning and implementation of development proposals		✓		✓	DoP
P3: Monitor and review the effectiveness of land use and transport planning decisions in influencing Perth's air quality		✓		✓	DoP and DEC
P4: Assist local government in influencing the community's travel behaviour to bring about positive change		✓		✓	DoT, DoP and DEC
Initiative 8: Haze reduction					
P1: Increase community awareness of the impacts of domestic wood heaters on air quality		✓		✓	DEC
P2: Increase awareness among wood suppliers and wood heater installers of the impacts of wood heaters on air quality		✓		✓	DEC
P3: Domestic smoke nuisance resolution		✓		✓	DEC, DoH and DLG
P4: Manage green waste disposal and recycling to reduce local haze creation				✓	DEC

The table summarises progress undertaken by agencies to complete the initiatives and programs of the Perth AQMP. More detailed information on the initiatives and programs is provided in the detailed agency section in Appendix 1.	Action				Lead agency
	No progress	Progressed	Completed	Future work	
Initiative 9: SME emissions reduction					
P1: Encourage cleaner production		✓		✓	DLG, DEC and OOE
Initiative 10: Smoke management					
P1: Establish a smoke management awareness group to facilitate community education and information about smoke impacts from planned burns		✓		✓	DEC
P2: Smoke Management Liaison Group		✓		✓	BOM, DEC and FESA
P3: Smoke management policy and regulation		✓		✓	FESA, DEC and DLG
P4: Smoke management research		✓		✓	DEC and BoM





Air quality influences

Statistics to quantify factors impacting on the Perth AQMP achieving its objectives are in Table 4. These parameters are updated regularly and are accessible through the Australian Bureau of Statistics (ABS).

Table 4 Context statistics

Perth metro population ¹	1,658,992 (1.7% increase from previous financial year) (71.59% of WA total population)									
Airshed area	5,386.8km ²									
Population density ¹	308 persons / km ²									
WA Vehicles ²	1,912,739 (2.7% increase from 2010)									
Fuel type	Petrol leaded	Petrol unleaded	Total petrol	Diesel fuel	LPG/Dual/Other					
	82,327	1,402,985	1,485,312	364,294	63,133					
	(by number of registered vehicles) ²									
Vehicles per capita (WA) ²	829 vehicles per 1,000 residents (highest in Australia)									
Vehicle use ²	66.6% private vehicles (as the main form of transport on usual trip to work or full- time study)									
Motor vehicles on register ²	Passenger vehicles		Camper vans	LCVs	Light rigid trucks	Heavy rigid trucks	Artic. trucks	Non- freight carry trucks	Buses	Motor-cycles
2009	1,345,494		7,535	299,638	11,984	47,340	11,944	4,360	13,007	87,044
2010	1,369,133		7,611	308,516	12,438	48,352	12,229	4,470	13,418	93,901
2011	1,394,241		7,941	318,147	13,160	49,089	12,590	4,582	13,597	99,392
Public transport use ³	11% used public transport as the main form of transport on usual trip to work or full- time study									
Wood heaters in Perth ³	46,300 (7.4% of dwellings use wood heaters as their main source of space heating)									
Heavy Industry	The major heavy industrial area is located in Kwinana in the south-west of the Perth metropolitan region, between Fremantle and Rockingham.									
WA Industrial growth (all sectors) ⁴	Employment at end of June		Wages and salaries		Sales and service income					
	2008-09	2009-10	2008-09	2009-10	2008-09	2009-10				
	'000	'000	\$m	\$m	\$m	\$m				
	1,111	1,152	50,443	52,689	359,385	355,976				
AQ data	Eight monitoring stations monitoring Perth ambient air quality									
Topography	The Perth metropolitan region is predominantly flat. The gently undulating sand dunes of the Swan Coastal Plain stretch from the coast to the Darling Ranges, which lie between 30km and 40km to the east. The Darling Ranges rise up to a height of around 300m above sea level.									
Climate and weather	Perth has a Mediterranean climate, with hot and dry summers, and cool and wet winters. During summer months the major weather influences are the south-westerly sea breeze and the development of a low pressure trough down the West Coast. During winter months, cold fronts move rapidly across the Indian Ocean, bringing frequent rain and gusty winds to the city. Air quality in Perth is significantly affected by features of the regional meteorology. Temperature inversions on very calm cold nights trap the pollutants near the earth's surface. Sea breezes sometimes recirculate urban pollutants, which were blown offshore from Perth during morning hours.									

1 ABS, Australian demographic statistics Cat. No. 1367.5 and 3218.0, January/March 2011; Estimates for major population regions at 30 June 2011

2 From the ABS 2011 Motor Vehicle Census Cat. No. 9309.0 – Vehicles registered at 31 January 2011 in Western Australia

3 Main source of energy used in space heating in Capital City 2010. ABS, *Australia's Environment: Issues and Trends* 2010, Cat. No.

4613.04602.0.55.001, Australian Bureau of Statistics Canberra

4 From ABS Australian Industry Cat. No 8155.0 2009–10



Air quality monitoring data

The purpose of this section is to provide an indication of Perth's air quality and, by extension, the success or otherwise of the Perth AQMP. It is important to note there is no one measure of air quality that can provide this as each approach has its limitations and many programs cannot be directly related back to monitoring results. Additionally, for many pollutants there is no safe level below which health is not adversely affected; so even with relatively clean air, measurable adverse health impacts may still occur.

The National Environment Protection (Ambient Air Quality) Measure provides a nationally consistent framework for the monitoring and reporting of six common pollutants (criteria pollutants): particles (PM_{10}), ozone (O_3), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO) and lead (Pb). Additionally there is an advisory reporting standard for particles as $PM_{2.5}$. Presented below are the results of monitoring for the criteria pollutants in the Perth airshed.

Figure 1 Air quality monitoring locality map



Interpreting graphs

The following graphs show statistical information for the past ten years monitoring. Each graph shows the maximum, 99th percentile, 98th percentile, 95th percentile and 90th percentile of daily maximum concentration for all pollutants monitored by DEC. The nominated percentiles can also be expressed as an nth highest concentration. Based on 100 per cent data recovery and a normal year (365 days), the following table gives each percentile an equivalent nth highest ordinal value. The bracketed numbers represent the exact (as calculated) value of the ordinal number.

Percentile	Nth highest
100	1 (maximum)
99	5 (4.65)
98	8 (8.3)
95	19 (19.25)
90	38 (37.5)

Some of these graphs also have the NEPM standard included to allow easy comparison.

2010 National Environment Protection (Ambient Air Quality) Measure results summary

The AAQ NEPM standards for CO, NO₂, O₃ and SO₂ were not exceeded at any site during 2010. While for PM₁₀ there were some exceedences, the NEPM goal allows for a number of exceedences per year for some air pollutants (see Table 5).

Caversham, Duncraig and Quinns Rocks each recorded three exceedences of the PM_{2.5} advisory standard during 2010 while South Lake recorded two exceedences.

Other than the PM_{2.5} advisory standard, all NEPM goals were met within the Perth metropolitan region during 2010.

The exceedences for 2010 are summarised in Table 6.

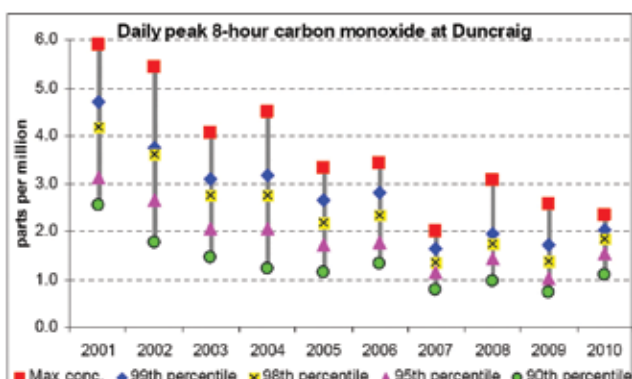
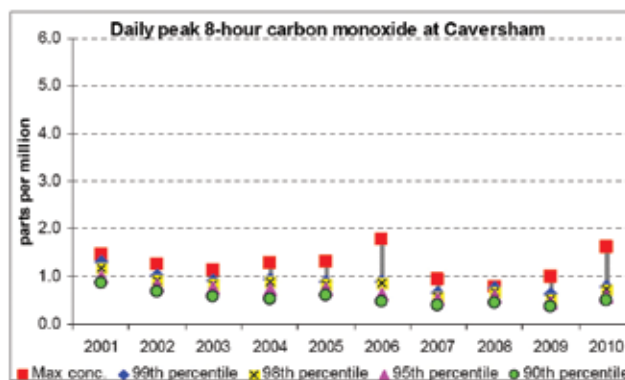
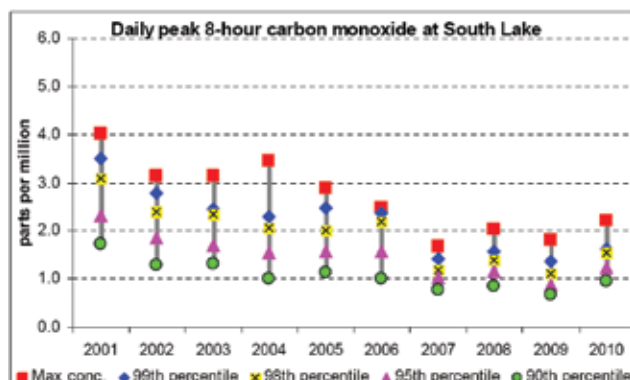
Note: This report card is based on achievements over the 2010/2011 financial year; however the following data summary is based on calendar year emissions data to ensure consistency with NEPM reporting.

Table 5 National Environment Protection (Ambient Air Quality) Measure standards and goals

Pollutant	Averaging period	Maximum (ambient) concentration (ppm)	Maximum allowable exceedences by 2008
Carbon monoxide	8 hours	9.0ppm	1 day per year
Nitrogen dioxide	1 hour	0.12ppm	1 day per year
	1 year	0.03ppm	None
Sulfur dioxide	1 hour	0.20ppm	1 day per year
	1 day	0.08ppm	1 day per year
	1 year	0.02ppm	None
Lead	1 year	0.50µg/m ³	None
Photochemical oxidants (as ozone)	1 hour	0.10ppm	1 day per year
	4 hours	0.08ppm	1 day per year
Particles (as PM ₁₀)	1 day	50µg/m ³	5 days per year
Advisory Standards (as at 30 June 2011)			
Particles (as PM _{2.5})	1 day	25µg/m ³	
	1 year	8µg/m ³	

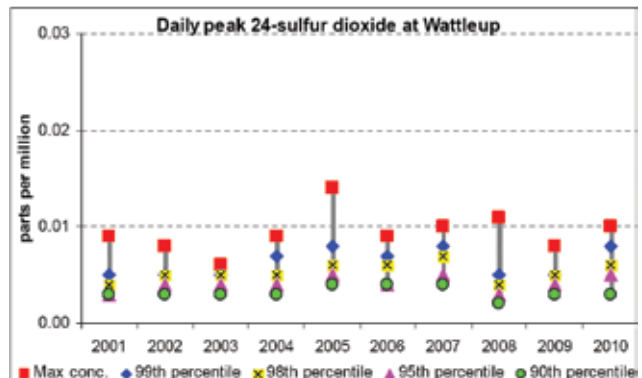
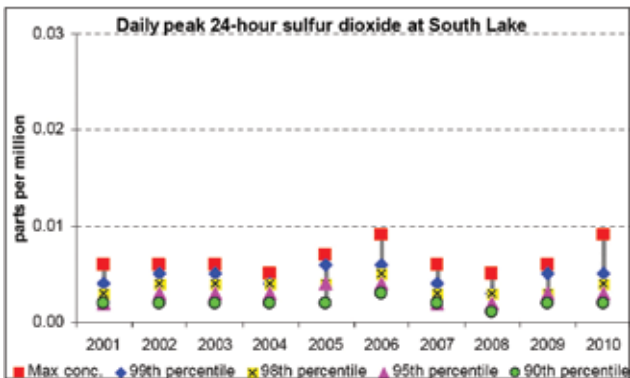
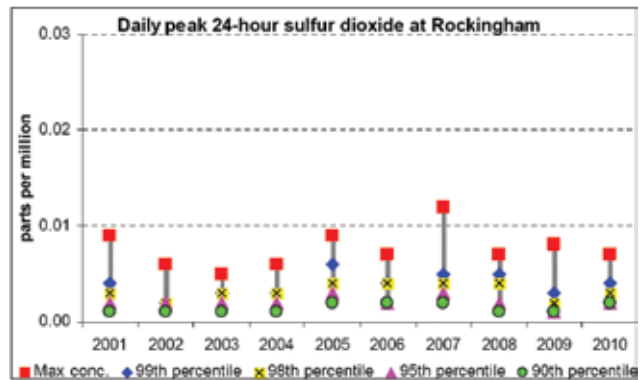
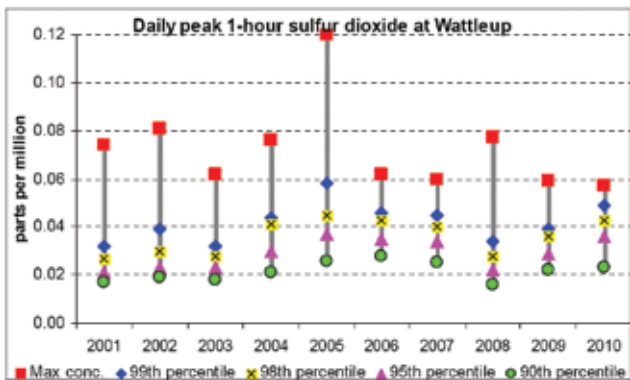
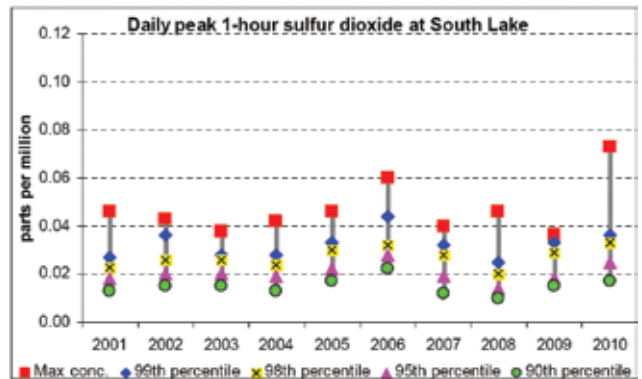
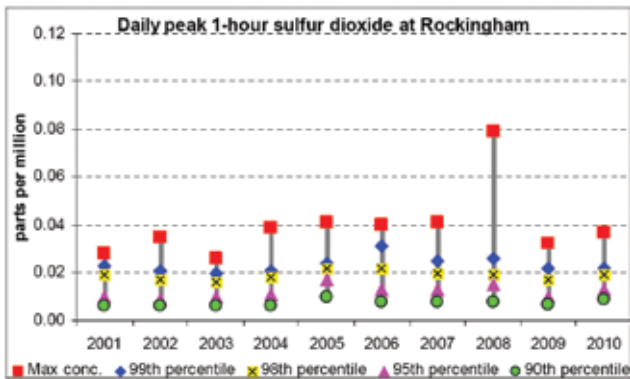
CO

The graphs below show CO trends from 2000 to 2010. In 2010, AAQ NEPM standard for carbon monoxide of 9.0ppm averaged over eight hours was not exceeded at any site.



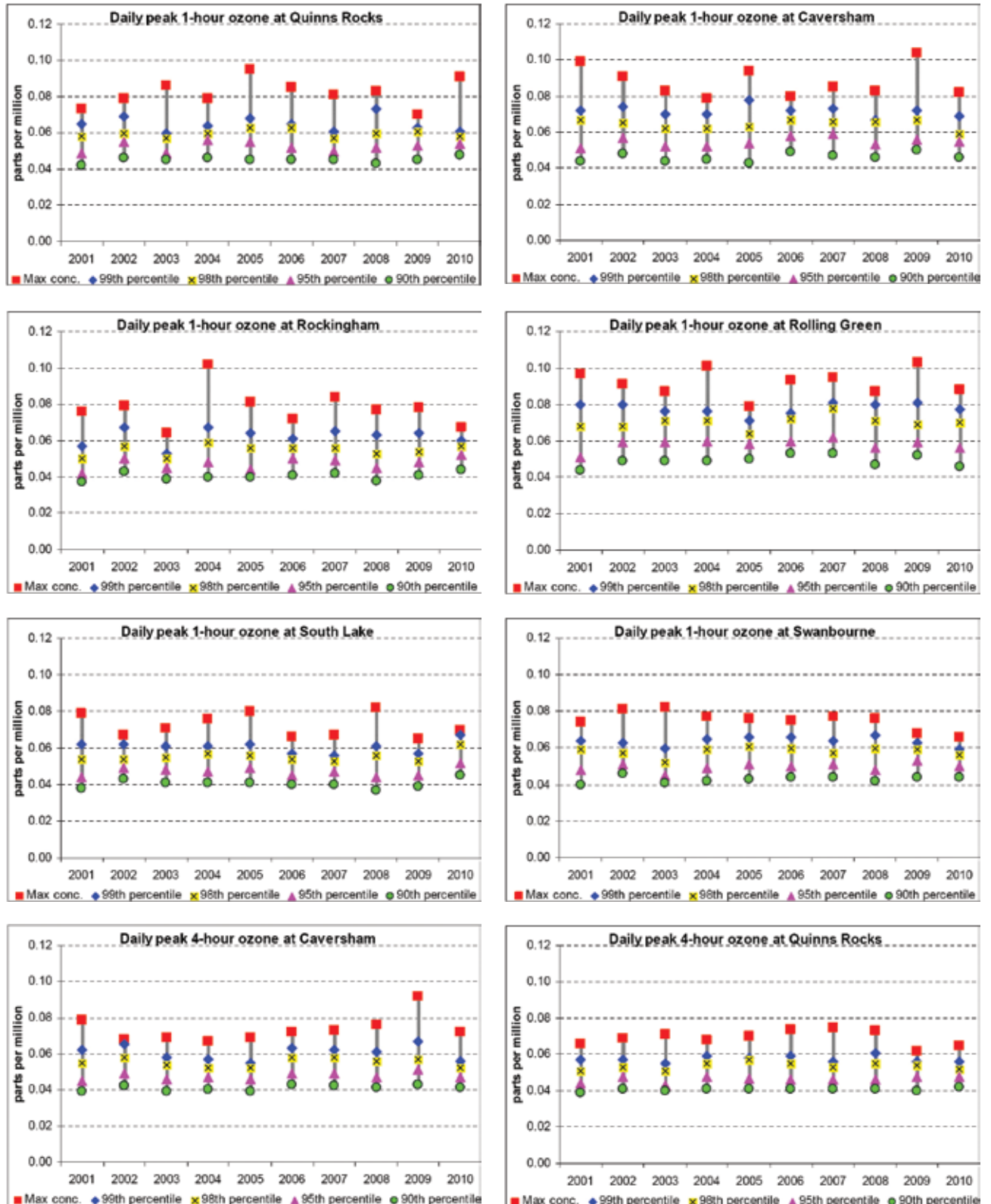


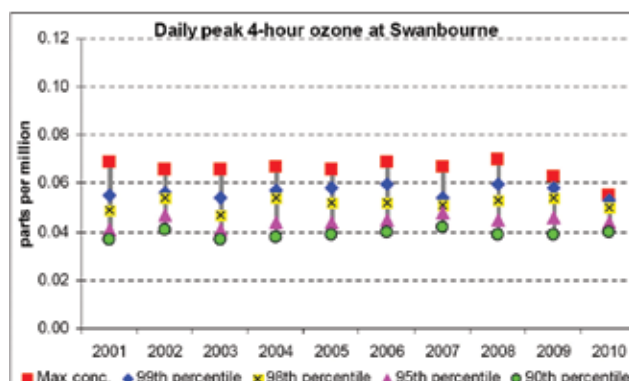
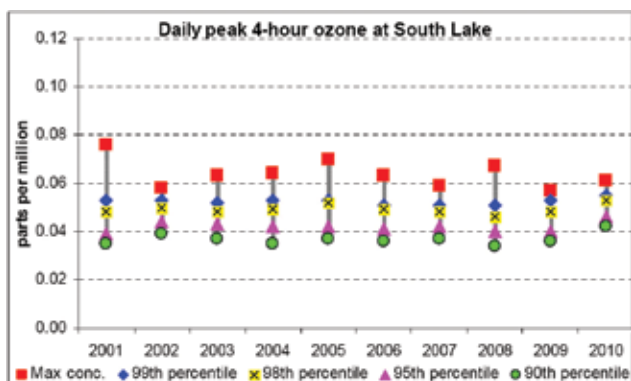
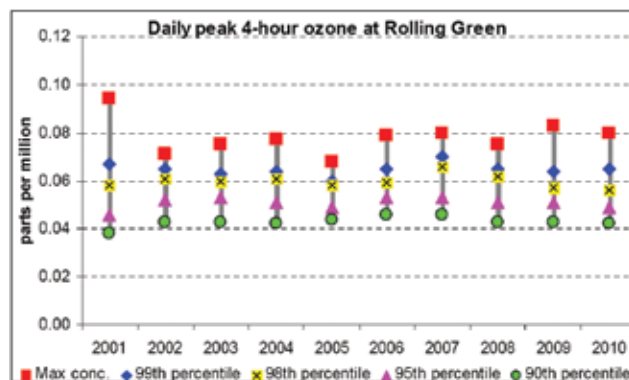
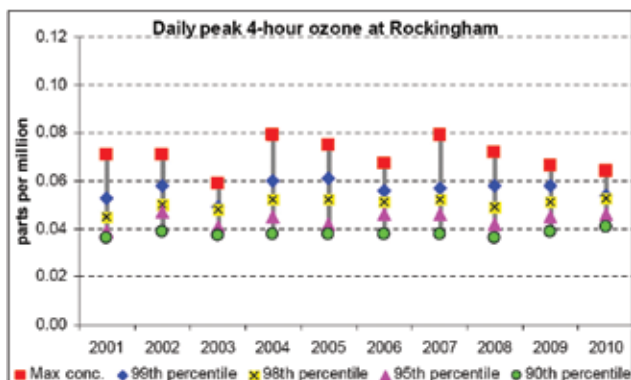
The graphs below show SO_2 trends from 2000 to 2010. In 2010, the AAQ NEPM standard for sulfur dioxide of 0.20ppm averaged over one hour, the annual standard of 0.02ppm and 0.08ppm averaged over 24 hours were not exceeded at any site.





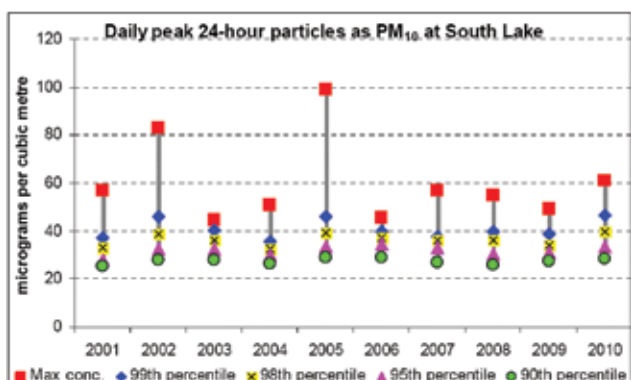
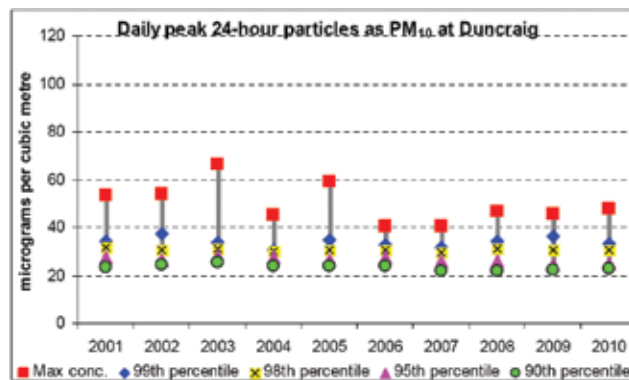
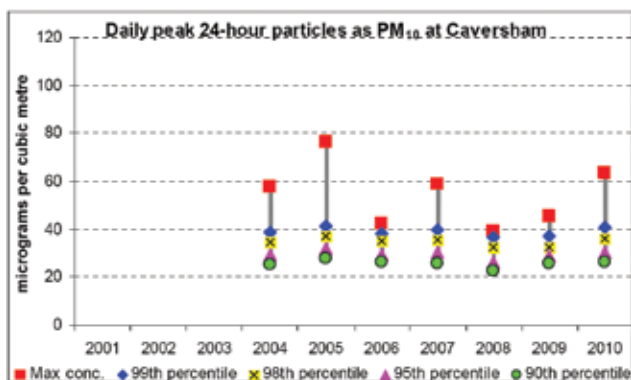
The graphs below show O_3 trends from 2000 to 2010. In 2010, the standard for ozone of 0.10ppm averaged over one hour and 0.08ppm averaged over four hours were not exceeded at any site.





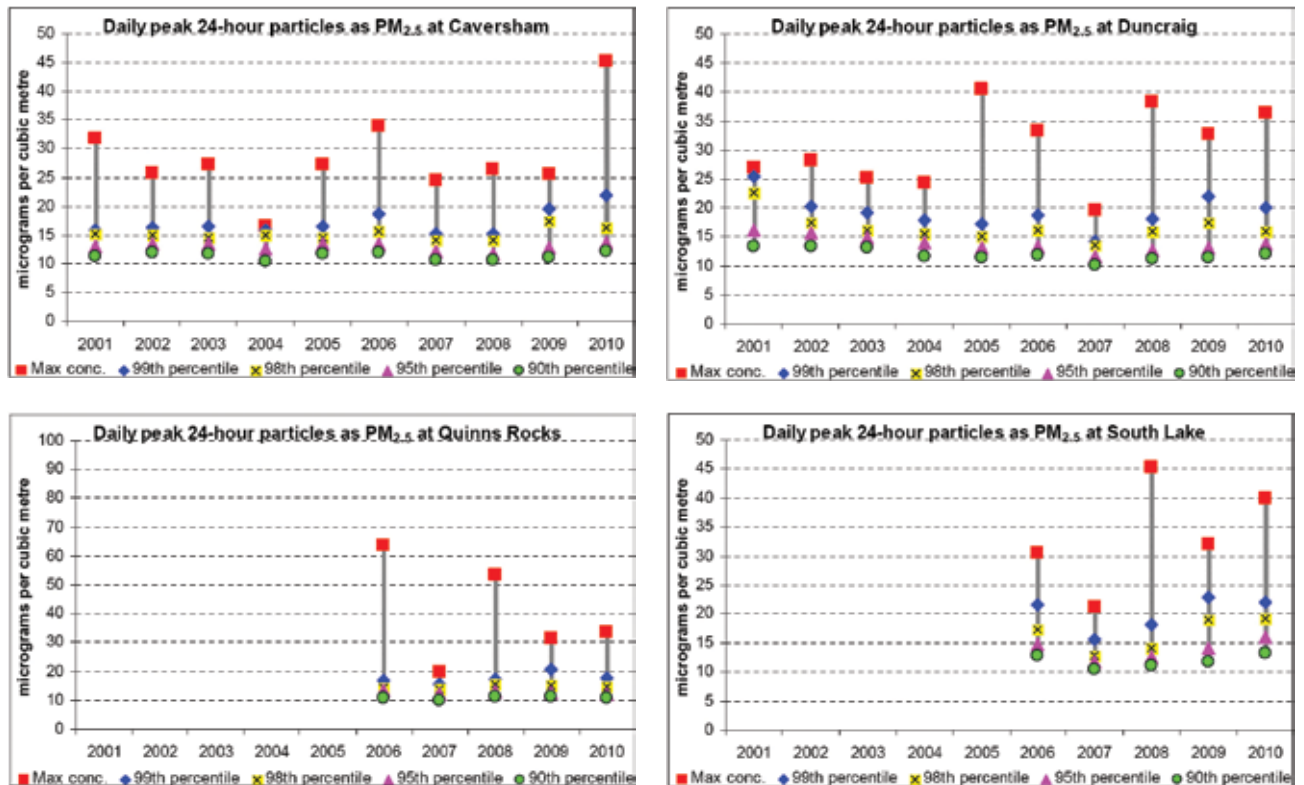
Particles (PM_{10})

The graphs below show PM_{10} trends from 2000 to 2010. In 2010, the NEPM standard for particles as PM_{10} of $50\mu g/m^3$ averaged over 24 hours was exceeded once at Caversham and four times at South Lake. However, the NEPM goal of no more than five exceedences was met at all sites.



Particles (PM_{2.5})

The graphs below show PM_{2.5} trends from 2000 to 2010. In 2010, the NEPM advisory standard for particles as PM_{2.5} of 25 ug/m³ averaged over 24 hours was exceeded three times at Duncraig, Quinns Rocks, and Caversham as well as twice at South Lake. The NEPM advisory standard for particles as PM_{2.5} of 8 ug/m³ averaged over one year was exceeded at Duncraig, South Lake and Caversham.



Pb

From 1995, lead levels at Queens Building in the Perth central business district have been below 60 per cent of the 0.5ug/m³ annual NEPM standard. In 2001, the average lead level in Perth was 0.022ug/m³, less than five per cent of the NEPM standard. Due to these low levels the performance monitoring station for lead was decommissioned in 2001.

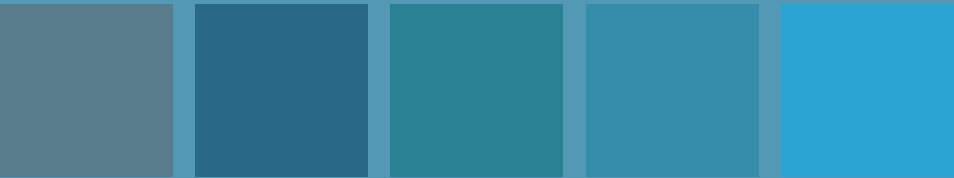


Table 6 2010 Exceedences in the Perth Airshed

Site	Pollutant	Value	Date / Time	Reason
Caversham	PM _{2.5} – 24 hour	27.3 ug/m ³	24/04/2010	Smoke haze
Caversham	PM ₁₀ – 24 hour	63.4 ug/m ³	06/05/2010	Smoke haze
Caversham	PM _{2.5} – 24 hour	45.2 ug/m ³	06/05/2010	Smoke haze
Caversham	PM _{2.5} – 24 hour	27.5 ug/m ³	31/12/2010	Smoke haze
Duncraig	PM _{2.5} – 24 hour	36.4 ug/m ³	06/05/2010	Smoke haze
Duncraig	PM _{2.5} – 24 hour	29.0 ug/m ³	30/12/2010	Smoke haze
Duncraig	PM _{2.5} – 24 hour	28.2 ug/m ³	31/12/2010	Smoke haze
Quinns Rocks	PM _{2.5} – 24 hour	33.7 ug/m ³	06/05/2010	Smoke haze
Quinns Rocks	PM _{2.5} – 24 hour	32.3 ug/m ³	30/12/2010	Smoke haze
Quinns Rocks	PM _{2.5} – 24 hour	28.6 ug/m ³	31/12/2010	Smoke haze
South Lake	PM ₁₀ – 24 hour	61.0 ug/m ³	30/01/2010	Crustal
South Lake	PM ₁₀ – 24 hour	60.0 ug/m ³	06/05/2010	Smoke haze
South Lake	PM _{2.5} – 24 hour	39.6 ug/m ³	06/05/2010	Smoke haze
South Lake	PM ₁₀ – 24 hour	51.6 ug/m ³	26/12/2010	Crustal
South Lake	PM ₁₀ – 24 hour	51.9 ug/m ³	30/12/2010	Smoke haze
South Lake	PM _{2.5} – 24 hour	34.4 ug/m ³	30/12/2010	Smoke haze

Key:

Crustal A smaller proportion of PM2.5 particles within PM10.
Smoke haze A higher proportion of PM2.5 particles within PM10.





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